

PROPOSED

TEMPORARY COVERED SOURCE APPLICATION REVIEW

Permit Number: 0515-01-CT

Application for a Modification No. 0515-02

Applicant: **Isemoto Contracting Company**
Application No. 0515-02 Application for a Modification

Facility: **465 tph Portable Stone Crushing and Processing Plant
with 317 kW and 750 bhp Cummings Diesel Engines (DE)**
Located At: Various Locations, State of Hawaii
Initial Location: Maniniowali Subdivision off Queen Kaahumanu Highway,
Kailua-Kona, Hawaii 96740

UTM-Coordinates: Zone 5, 814,150 m E, 2,192,050 m N (NAD 83)

Mailing Address: 74-5039 B Queen Kaahumanu Highway
Kailua-Kona, Hawaii 96740
Phone: (808) 329-8051

Standard Industrial Classification Code: 1429 Crushed and Broken Stone

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Proposal For a Modification

The permittee has requested a modification to the 465 tph Portable Stone Crushing and Processing Plant to add a 490 tph cone crusher as a secondary crusher along with a standby 750 bhp diesel engine. This review addresses the modification, with some comments relating to the entire stone crushing plant, when necessary.

New Equipment Description and Specifications

<u>Equipment</u>	<u>Description</u>
1. Cone Crusher	490 tph Cedarapids, model MVP 280, identification number 2294-04, manufactured in 2004. This cone crusher has a closed side variable setting feeder.
2. Diesel Engine	750 bhp Cummins (standby 732 hp, prime 668 hp), model QSX15-G9, identification number 2311-04, maximum fuel consumption 34.7 (full standby power) gallons per hour of fuel oil no. 2, with less than 0.5% sulfur by weight.

The raw material consists of basalt and concrete. The raw material is loaded into the primary Pioneer jaw crusher by a front end loader. Output from the primary jaw crusher is transferred by conveyor belt to the added secondary cone crusher. The variable-setting feeder screens the larger stones into the cone crusher and the smaller crushed stones fall through the feeder onto a conveyor onto a stockpile.

Applicable Requirements

Hawaii Administrative Rules (HAR) Title 11

Chapter 11-59, Ambient Air Quality Standards

Chapter 11-60.1 Air Pollution Control

Subchapter 1, General Requirements

Subchapter 2, General Prohibitions

§11-60.1-31 Applicability

§11-60.1-32 Visible Emissions

§11-60.1-33 Fugitive Dust

§11-60.1-38 Sulfur Oxides from Fuel Combustion

Subchapter 5, Covered Sources

Subchapter 6, Fees for Covered Sources, Noncovered Sources, and
Agricultural Burning

§11-60.1-111 Definitions

§11-60.1-112 General Fee Provisions for Covered Sources

§11-60.1-113 Application Fees for Covered Sources

§11-60.1-114 Annual Fees for Covered Sources

Subchapter 8 Standards of Performance for Stationary Sources

§11-60.1-161 New Source Performance Standards

Subchapter 9, Hazardous Air Pollutant Sources

Subchapter 10, Field Citations

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40 Code of Federal Regulations (CFR) Part 60-Standards of Performance for
New Stationary Sources
Subpart A-General Provisions
Subpart OOO-Standards of Performance for Nonmetallic Mineral
Processing Plants

Standards of Performance for New Stationary Sources [also known as New Source Performance Standards (NSPS)] is applicable. A portable crushed stone plant, that commences construction, reconstruction, or modification after August 31, 1983, with a capacity of 150 tons per hour or greater, is subject to the requirements of Title 40 Code of Federal Regulations (CFR) Part 60 Subpart OOO Standards of Performance for Nonmetallic Mineral Processing Plants. Fixed sand and stone plants with capacities of 25 tph or greater are subject to the same provisions. The maximum capacity of this 465 tph portable stone crushing plant is greater than 150 tph. All conditions as specified in Subpart OOO apply to this facility.

Synthetic Minor refers to sources which have the potential to emit greater than 100 ton per year of a regulated air pollutant, or 10 tons per hazardous air pollutant, or 25 tons per year for any combination of HAPs, but where limits are proposed to reduce emissions below these levels. A synthetic minor source is a potentially major source but is made a minor source through federally enforceable permit conditions, for example, limiting the facility's hours of operation, limiting the facility's fuel consumption, or the plant's material production throughput. Pollution control devices are considered as part of the facility. Based on the potential emissions at 8,760 hours per year, and the limited hours of operation, this stone crushing plant is a synthetic minor.

Non-Applicable Requirements

Compliance Assurance Monitoring (CAM), Part 64 of the CFR, is for large emission or major sources that rely on air pollution control devices to achieve compliance. Applicability of the CAM Rule is determined on a pollutant specific basis for each affected emission unit. Each determination is based upon a series of evaluation criteria. In order for a source to be subject to CAM, each source must apply to all of the below:

1. Be located at a major stationary source per Title V of the Clean Air Act Amendments of 1990? No.
2. Be subject to federally enforceable applicable requirements. Yes.
3. Have pre-control device potential emissions that exceed applicable major source thresholds. Yes.
4. Be fitted with an "active" air pollution control device; No.
5. Not be subject to certain regulations that specifically exempt it from CAM. Yes.

Emission units are any part or activity of a stationary source that emits or has the

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potential to emit any air pollutant. This stone processing plant does not have any active pollution control devices except for their water spray system to minimize their fugitive emissions. Water sprinklers are not pollution control devices applicable to CAM. CAM is not applicable because this facility does not meet all of the above requirements.

Consolidated Emission Reporting Rule (CERR) as defined by 40 CFR Part 51, Subpart A-Emissions Inventory Reporting Requirements. CERR is established to simplify reporting, offer options for data collection and exchange, and unify reporting dates for various categories of criteria pollutant emission inventory, for example, point, area, onroad, and nonroad mobile, and biogenics.

This rule applies to state and local agencies. CERR is based on facility-wide emissions for each air pollutant that emits at or exceeds the CERR and DOH triggering levels are shown in the table below.

Pollutant	1-465 tph Stone Crushing Plant (tpy)	750 bhp Cummins Diesel Engine (tpy)	CERR Trigger Levels Annual Inventory Type A/B Point Source (tpy)	In-house Total Facility Trigger Levels (tpy)
NO _x	-	11.6	2,500 / 100	25
SO _x	-	3.4	2,500 / 100	25
CO	-	1.1	2,500 / 1000	250
PM ₁₀	17	0.2 ³	250 / 100	25
PM _{2.5}	9.2 ⁴	0.2 ²	250 / 100	25
VOC	-	0.6	250 / 100	25
NH ₃ ¹	N/A	N/A	250 / 100	
Pb ¹	N/A	N/A	5	0.6

¹ NH₃ (ammonia) and Pb (lead) are not available.

² PM_{2.5} value, 90% of PM, referenced from AP-42; Appendix B.2; Table B.2.2; Category 1; Process: Stationary Internal Combustion Engines; Material: Gasoline and Diesel Fuel; For PM_{2.5} = (TSP 0.18) x (0.90) = 0.16

³ PM₁₀ value, 96% of PM, referenced from AP-42; Appendix B.2; Table B.2.2; Category 1; Process: Stationary Internal Combustion Engines; Material: Gasoline and Diesel Fuel; For PM₁₀ = (TSP 0.18) x (0.96) = 0.18.

⁴ PM_{2.5} value, 15% of PM, referenced from AP-42; Appendix B.2; Table B.2.2; Category 3; Process: Mechanically Generated; Material: Aggregate, Unprocessed Ores For PM_{2.5} = (TSP 61) x (0.15) = 9.15

This modification emissions added to the existing plant's emissions does not have any individual emission points that emits at the CERR or in-house triggering levels. However, because this is a covered source, annual emissions reporting is required.

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National Emission Standards for Hazardous Air Pollutants for Source Categories (NESHAPS): Pursuant to section 112 of the Clean Air Act (CAA), 40 CFR Part 61, §61.01(a) lists the substances which have been designated as HAPs. Under this part, NESHAPS is not applicable to this stone crushing plant because there are no listed standards for crushers. Very little HAPs (0.03 tons per 2800 hours per year) are being emitted from the added stand-by fuel oil no. 2 burning diesel engine.

Prevention of Significant Deterioration (PSD): 40 CFR Part 52, §52.21, PSD review applies to any new major stationary sources and major modifications to these types of sources as listed and defined in HAR, Title 11, Chapter 11-60.1, Subchapter 7. This facility is not a major stationary source for any single air pollutant. Annual emissions of the added cone crusher of total suspended particles with water sprays are calculated at less than 12 (plus 58 previously calculated for the entire plant) ton/year. Hence, PSD review is not required.

Best Available Control Technology (BACT) analysis applies to new and modified sources if the net increase in pollutant emissions exceed "significant levels" as defined in HAR §11-60.1-1 (considering any limitations, enforceable by the Department of Health, on the source to emit a pollutant). Also, for listed categories in CFR Parts 60, 61, and 63, BACT determination includes all fugitive emissions, except vehicle traffic emissions, in calculating potential emissions for major source determination.

BACT is an emissions limitation based on the maximum degree of reduction for each pollutant. On a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, if achievable through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of the pollutant, the applicant eliminates or supports step-by-step pollution control options, beginning at the top of a list of best available pollution control technology, taking into account:

- (1) Energy;
- (2) Environmental; and
- (3) Economic impacts and other costs, if achievable through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of the pollutant.

See Project Emissions below, for emission calculations. The calculated potential maximum emissions for this significant modification cone crusher, does not exceed the "significant levels" of 25 tons for particulate matter (PM) and 15 tons for particulate matter at 10 micrometers diameter and less (PM₁₀). Therefore, a Best Available Control Technology analysis is not required for this facility.

Title 40 Code of Federal Regulations Part 63-National Emission Standards for

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Hazardous Air Pollutants for Source Categories Maximum Achievable Control Technology, MACT means the maximum degree of reduction in emissions of the hazardous air pollutants (HAPs), taking into consideration the cost of achieving such emission reduction and any non-air quality health and environmental impacts and energy requirements, that is deemed achievable.

This source is not subject to MACT because there are no listed standards for cone crushers.

Insignificant Activities/Exemptions

None proposed by the applicant.

Alternative Operating Scenarios

An alternate operating scenario is defined as any situation that reasonably warrants removal of the equipment, for example, engine failure, or a need for engine overhaul, with emissions equal to or less than the initial equipment. The 750 bhp replacement engine is larger and emits more pollutants than the original engine. Therefore, it cannot be categorized as an alternate operating scenario.

The added 750 hp replacement diesel engine shall comply with the same terms, conditions, and monitoring reporting as the initial DE. The permittee shall notify the Department, prior to installing the stand-by DE.

Project Emissions

The pollutant from the added secondary Cedarapids cone crusher is fugitive dust (PM). Emissions from the stand-by substitute diesel fuel fired point source Cummins diesel engine are various criteria and hazardous air pollutants.

The criteria pollutants are total suspended particulates (TSP), particulate matter less 10 micrometers (PM₁₀), sulfur oxide (SO_x), carbon monoxide (CO), and total organic compounds (TOC).

Potential emission calculations are based on the maximum capacity of the primary crusher. The added secondary cone crusher's 490 tph is limited by the 465 tph primary jaw crusher. AP-42, 5th edition, Table 11.19.2-2 Emission Factors for Crushed Stone Processing Operations, August 2004, were used to calculate the fugitive dust emissions from the Cedarapids cone crusher. Because there were no primary and secondary crushing emission factors (EF), the tertiary crushing emission factor was used to predict the cone crusher's emissions.

The Cummins manufacturer's brochure data gave the emission factors of NO_x, CO, PM, and PM₁₀ in units of grams per horse power-hour.

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AP-42 Table 3.4-1 Emission Factors For Uncontrolled Diesel Industrial Engines, and Table 3.4-3 and 3.4-4 Speciated Organic Compound Emission Factors For Large Uncontrolled Stationary Diesel Engines and PAH Emission Factors for Large Uncontrolled Stationary Diesel Engines, respectively, October 1996, were used to estimate the criteria pollutants SO_2 and TOC, and hazardous air pollutant emissions from the added stand-by 750 bhp Cummins diesel engine.

Engine emissions were calculated with the high heat value of 19,300 Btu/pound of fuel oil, and the weight 7.1 pounds /gallon of fuel oil. The maximum fuel consumption rate of this Cummins engine is 34.7 gallons per hour (gph).

For emission calculations, 19,300 btu/lb multiplied by 7.1 lb/gal = high heat value of 137,030 Btu/gal of fuel oil.

For fugitive emission calculations, 70% efficiency was used at nozzle locations and throughout the stone processing line.

UNCONTROLLED ESTIMATED EMISSIONS¹ OF CRITERIA AND HAZARDOUS AIR POLLUTANTS OF THE 490 tph CONE CRUSHER AND THE 750 bhp DIESEL ENGINE								
Pollutant and	750 bhp Diesel Engine		Cone Crusher at 465 tph		750 bhp Diesel Engine		Cone Crusher at 465 tph	
	2800 hr/yr		2800 hr/yr		8760 hr/yr		8760 hr/yr	
Description	lbs/hr	tons/yr	TSP ton/yr	PM ₁₀ tons/yr	lbs/hr	tons/yr	TSP tons/yr	PM ₁₀ tons/yr
TSP	0.13	0.2			0.13	1		
PM ₁₀ ²	0.124	0.2			0.124	1		
CO	0.759	1.1			0.759	4		
NO ₂	8.313	11.6			8.313	37		
SO ₂	2.401	3.4			2.401	11		
TOC	0.428	0.6			0.428	2		
Benzene	-	0.005			-	0.02		
Toluene	-	0.002			-	0.006		
Xylenes	-	0.001			-	0.004		
Propylene	-	0.019			-	0.06		
Formaldehyde	-	0.0005			-	0.002		

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Acetaldehyde	-	0.0002			-	0.0005		
Acrolein	-	0.00005			-	0.0002		
Naphthalene	-	0.0009			-	0.003		
PAH ³	-	0.001			-	0.004		
Pri Crusher			-	-			-	-
Sec Crusher			3.52	1.56			11.0	4.89
Tert Crusher			-	-			-	-
Fines Crushing			-	-			-	-
Screening			-	-			-	-
Fines Screen			-	-			-	-
Conveyor Transfer Pts			7.81 4 pts	2.86 4 pts			24.4 4 pts	8.96 4 pts
Wet Drilling			-	-			-	-
Truck Unload Fragmented			-	-			0.0	0.0
Truck Unload Conveyor			0.0	0.0			0.	0.
Unpaved Road ³			-	-			-	-
Storage Piles ³			-	-			-	-
Σ		HAPs 0.03	TSP 11.4	PM ₁₀ 4.5		HAPs 0.1	TSP 35.5	PM ₁₀ 13.9

¹ See individual calc sheets in file folder for calculations and specific data.

² PM₁₀ value, 96% of PM, referenced from AP-42; Appendix B.2; Table B.2.2; Category 1; Process: Stationary Internal Combustion Engines; Material: Gasoline and Diesel Fuel; For PM₁₀ = (0.2) x (0.96) = 0.2.

³ PAH, polycyclic aromatic hydrocarbons

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CONTROLLED ESTIMATED EMISSIONS ¹ OF CRITERIA AIR POLLUTANTS 490 tph CONE CRUSHER				
Description	Cone Crusher at 465 tph			
	2800 hr/yr		8760 hr/yr	
	TSP ton/yr	PM ₁₀ tons/yr	TSP tons/yr	PM ₁₀ tons/yr
Primary Crusher	-	-	-	-
Secondary Crusher	1.05	0.47	3.30	1.47
Tertiary Crusher	-	-	-	-
Fines Crushing	-	-	-	-
Screening	-	-	-	-
Fines Screening	-	-	-	-
Conveyor Transfer Points 4	2.34	0.86	7.33	2.69
Wet Drilling Unfragmented	-	-	-	-
Truck Unloading Fragmented	0.00	0.00	0.0	0.0
Truck Unloading Conveyor	0.0	0.	0.0	0.0
Unpaved Roads ²
Storage Piles ²
Σ Totals	TSP 3.4	PM ₁₀ 1.3	TSP 10.6	PM ₁₀ 4.2

¹ See individual calc sheets in file folder for calculations and specific data.

For the plant's total emissions shown in the table below, the secondary Cedarapids cone crusher emissions were added to the existing emissions. And the larger stand-by Cummins 750 bhp diesel engine emissions was selected in place of the existing engine because of the potential greater emissions.

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CRITERIA POLLUTANT	TOTAL STONE CRUSHING PLANT WITH STAND-BY DIESEL ENGINE EMISSIONS (ton/yr)					
	2800 hours			8760 hours		
	Existing	Modification	Total	Existing	Modification	Total
TSP	57.94	3.4	61	181	10.8	192
PM ₁₀	15.46	1.3	17	48	4.2	52
CO	3.80	1.1	4	12	4	16
NO ₂	17.62	11.64	30	55	37	92
SO ₂	2.07	3.4	5	6.5	11	18
TOC	1.44	0.6	2	4.5	2	7

Air Pollution Controls

The existing water spray system will apply to the added cone crusher and the existing water truck will minimize fugitive dust emissions on access roads and other areas around the plant.

The added stand-by 750 bhp diesel engine (DE) will be fired exclusively on fuel oil no. 2 with less than or equal to 0.5% sulfur content by weight to minimize sulfur dioxide emissions.

Air Quality Assessment

Ambient air means the general outdoor atmosphere to which the public has access. The numerical ambient air standards limit the time-average concentration of specified pollutants dispersed or suspended in the ambient air of the State, and these standards do not in any manner authorize the significant deterioration of existing air quality in any portion of the State.

An ambient air quality impact analysis is performed for new or modified sources. The ambient air quality standards seek to protect public health and welfare and to prevent the significant deterioration of air quality.

The Department of Health air modeling guidance generally exempts an applicant from performing an ambient air quality impact analysis for

- (1) existing sources with no proposed modifications,
- (2) insignificant activities,
- (3) fugitive emission sources (for example, storage tanks, storage piles, and pipe leaks), and
- (4) intermittent operating noncombustion sources.

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This 750 bhp stand-by diesel is a new source, therefore, the diesel engine's stack emissions of pollutant concentrations need to be assessed to verify compliance with the ambient air quality standards.

AP-42 Table 3.4-1 Gaseous Emission Factors For Large Stationary Diesel Engines greater than 600 hp, October 1996, were used to estimate the emissions from the diesel engine for sulfur oxide (SO_x) and total organic compounds (TOC). The emission factors in units of pounds of pollutant per million Btu of fuel oil burned were converted to pounds per hour and then to grams per second for modeling.

The diesel engine emissions for hydrocarbons (HC), nitrogen oxide (NO_x as NO₂), carbon monoxide (CO), and particulate matter (PM) in units of grams per horsepower-hour were taken from the manufacturer Cummin's catalog submitted by the applicant, and converted into grams per second for modeling input.

DIESEL ENGINE ¹ CRITERIA POLLUTANT EMISSION RATE							
	NO _x	CO	SO _x ^{2, 4}	PM	PM ₁₀ ³	TOC ⁴	HC as TOC
lb / MMBtu			1.01S			0.09	
gram / hp-hour	5.15	0.47		0.08	0.0768		0.18
gram / hour ¹	3,770	344		59	56.218		132
gram / second	1.047	0.096	0.303	0.016	0.016	0.054	0.037
lb / hour ⁵	8.313	0.759		0.130	0.124		0.291

¹ Added Cummings diesel engine stand-by horsepower at full load 732 was used to calculate gram/hp-hr to gram/hr. For example, NO_x = 5.15 x 732 = 3,770.

² Assumes that all sulfur in the fuel is converted into SO₂. For example, if sulfur content is 0.5%, then S = 0.5.

³ PM₁₀² value, 96% of PM, referenced from AP-42; Appendix B.2; Table B.2.2; Category 1; Process: Stationary Internal Combustion Engines; Material: Gasoline and diesel fuel; For PM₁₀ = (0.08) x (0.96) = 0.768

⁴ AP-42 Table 3.4-1 Gaseous Emission Factors For Large Stationary Diesel Engines greater than 600 hp, October 1996.

⁵ Conversion factor, multiply by 0.002205 to change grams to pounds. For example, NO_x = 3,770 x 0.002205 = 8.313.

The following table shows the results of the SCREEN3 modeling, consistent with 40 CFR Part 51, Appendix W, simple terrain, with the dimensions of the jaw crusher as downwash wake structure. Screen3 default meteorology was used to predict ambient air impacts. See "Source Information" section in file folder for input and output text and results of Screen3, and maximum concentration 586 micrograms per cubic meters (g/m³), touched the ground 35 meters from stack.

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The applicant proposed to limit the plant's operation to 2,800 hours per rolling twelve (12) month period.

CUMMINS DIESEL ENGINE STACK DATA					
Stack Ht	Stack Dir	Stack Id	Exit V	Flow Rate Q	Stack Gas Exit Tmp
16' - 5" (5m)	up	6" (0.15m)	268 ft/s (81.74 m/s)	3160 ft ³ /min (1.49 m ³ /s)	880 °F (744 °K)

The highest concentration per volume collected amongst three monitoring stations, were selected as background concentration for this air quality assessment. The three monitoring stations are (1) Kona, from the SLAMS and NAMS 2004 Annual Summary Hawaii Air Quality Data booklet, (2) Huehue Monitoring Station, Keahole, February '99 - May 2000, and (3) Kakahiaka Monitoring Station, Keahole, February - May 2000.

COMPLIANCE WITH AMBIENT AIR QUALITY STANDARDS						
750 bhp Cummins Diesel Engine						
AIR POLLUTANT	AVG'G TIME	PREDICTED AIR QUALITY IMPACTS (µg/m ³)			HAWAII AIR STANDARD (µg/m ³)	PERCENT OF STD (%)
		DEG	BCKGRD ¹	TOTAL		
Carbon Monoxide CO	1-hour 8-hour	57 40	542 321	599 361	10,000 5,000	6 7
Nitrogen Dioxide NO ₂	Annual	40	9	49	70	70
Particulate Matter PM ₁₀	24-hour Annual	4 1	27 13	31 14	150 50	21 28
Sulfur Dioxide SO ₂	3-hour 24-hour Annual	160 71 12	55 21 20	215 92 32	1,300 365 80	17 25 40

¹ Carbon Monoxide (CO), 1-hour from Huehue, May 2000; 8-hour from Kakahiaka, April 2000; NO_x as NO₂ (nitrogen dioxide), from 2004 Annual Summary Hawaii Air Quality Data, Kapolei, December 2004, near the entrance to Campbell Industrial Park; Particulate Matter (PM₁₀), 24-hour and annual from Kakahiaka, April 2000; Sulfur Dioxide (SO₂), 3-hr, and 24-hr, from 2004 Annual Summary Hawaii Air Quality Data, and annual estimated from Konawaena High School, Kealahou;

Other Issues

None.

Significant Permit Conditions

1. Subject to Title 40 Code of Federal Regulations (CFR) Part 60-Standards of Performance for New Stationary Sources, Subpart OOO.
2. A non-resetting hour meter shall be installed on the substitute stand-by Cummins 750 bhp diesel engine for the recording of the 2800 limiting hours of operation of the portable stone quarrying and processing plant.
3. The water spray system shall be utilized as necessary while the plant is in operation.
4. For periods of diesel engine breakdown or overhaul, prior to the removal, the permittee shall submit to the Department of Health, written documentation on the removal and estimated return dates and on the make, size, model, and serial number for both the temporary replacement unit and the existing unit.

Conclusion And Recommendation

Based on the information submitted by the applicant, it is the determination of the Hawaii Department of Health that the modification to the stone crushing plant will be in compliance with 40 CFR Part 60, Subpart A, Subpart OOO, and the Hawaii Administrative Rules (HAR), Chapter 11-60.1, and will not cause or contribute to a violation of any State or National ambient air quality standards.

Conservatism was applied to the estimated emissions from this facility. The actual crushing throughput will be much lower (basalt) than the assumed maximum design capacity used in the AP-42 emission calculations (limestone). Therefore, the Hawaii DOH intends to issue this CSP No. 0515-01-CT, subject to permit conditions, public comments, and EPA review.

December 2005

GN:jhm